OSCAR®

User guide

Preface

This user guide contains the information you need to make effective use of the OSCAR Asset-Manager® and OSCAR Traffic-Manager® product and service and is designed to help you understand the information contained in the data, as well as providing detailed technical information and the data format specification.

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Phone: 023 8030 5030
Fax: 023 8079 2615
Email: customerservices@ordnancesurvey.co.uk

Welsh Language HelpLine [in Welsh] phone: 08456 05 05 04

or write to:

Customer Contact Centre
Ordnance Survey
Romsey Road
SOUTHAMPTON
United Kingdom
SO16 4GU

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Chapter 1 Introduction

Using this user guide

This chapter and chapter 2 provide an introduction to the OSCAR® product family and illustrate potential applications. Chapter 3 contains more detailed information about OSCAR. Please refer to the glossary at appendix A if you are unfamiliar with any of the terms used.

All aspects of OSCAR discussed in this user guide relate to OSCAR in BS 7567 (NTF v2.0 Level 3).

Full technical information on OSCAR data format is contained in chapters 6 and 7.

Example data graphics in this user guide have been manipulated to aid clarity. Other data, where added, is fictitious.

OSCAR – an introduction

The OSCAR product family is an Ordnance Survey data product that provides a digital representation of the road network of Great Britain derived from a single source: Ordnance Survey's ROADS database:

- OSCAR Asset-Manager® has centrelines of all publicly accessible and maintained roads. Private and pedestrianised roads have been included, where possible. Centrelines fall within road casings – defined within Ordnance Survey Land-Line®.
- OSCAR Traffic-Manager® has a 2 m filter with road junctions restructured to mirror the positioning of vehicles passing through them.

OSCAR features

The OSCAR product family are supplied as vector data in a link and node structure – where links are road centrelines and nodes are intersections of links – with attributes attached to each feature. Each road is classified by means of a feature code, with unique identifiers to enable you to create consistent references between releases of OSCAR.

The links within OSCAR Traffic-Manager have all been filtered, thereby reducing data quantities while retaining a realistic representation of the road network. The retention of the nodes in true National Grid position ensures a high level of physical precision within the roadway.

The OSCAR product family includes the following features and attributes:

Features:

- motorways;
- A roads;
- B roads;
- minor roads;
- pedestrianised roads; and
- private roads.

Link attributes:

- road name;
- Department for Transport (DfT) number;
- link length;
- unique link identifier – ROADS Database Reference (OSODR);
- trunk roads;
- source scale; and
- form of way.

Node attributes:

- unique identifier (OSODR);
- Settlement name;
- Junction name – where applicable; and
- Grade separation – road over road.

OSCAR benefits

The high specification of OSCAR offers a number of benefits:

- National coverage.
- The definitive road dataset for Great Britain suited to multiple applications using geographical information systems (GIS) and digital mapping systems.
- Length values for every road.
- Unique link and node identifiers are retained at each update.
- Compatibility with other Ordnance Survey digital products.
- Unique reference points allow the means to coordinate services between different departments, agencies and organisations.
- Accurate and reliable routeing and planning information.
- A common and consistent base for the exchange of road information.
- All attributes feature DfT numbers and names where applicable.
- All OSCAR products are quality assured and are regularly updated.

OSCAR applications

The OSCAR product family provides a comprehensive topological base of road information for a wide range of applications. Possible uses include:

OSCAR Asset-Manager	OSCAR Traffic-Manager	Uses
✓	✓	Accident analysis
✓		Asset recording and inventory management
✓	✓	Catchment area analysis
✓	✓	Command and control
✓		Defect surveys
✓	✓	Derivation of street gazetteers
✓	✓	GIS analysis, indexing and mapping
✓		Highway planning and engineering
	✓	In-vehicle navigation and guidance
	✓	Linking traffic and travel information
✓		Locational referencing
	✓	Logistics management
✓	✓	Real-time traffic control
✓		Recording street works and other related features
✓	✓	Road and highway maintenance
✓		Road design
	✓	Route planning
	✓	Routeing analysis
	✓	Scheduling and delivery
	✓	Site location
✓		Street furniture
✓	✓	Traffic and travel information management
✓	✓	Vehicle tracking

What you need to use OSCAR

Hardware

Providing that sufficient memory and storage facilities are available there are no constraints on hardware platforms which can be used for the OSCAR product family. The range of hardware which can typically be used varies from higher specification personal computers (PCs) to mainframe computers.

Software

OSCAR data does not include software for analysis, but can be used with a variety of programs. To fully exploit OSCAR data it is necessary to use appropriate application software. There are many proprietary systems available and we publish a list of GIS, computer-aided design (CAD) and digital mapping licensed system suppliers who have confirmed their software can import Ordnance Survey NTF data. Contact us at the address at the beginning of this user guide for a copy of the list. We cannot, however, accept any responsibility for any third party software you use in conjunction with the OSCAR data.

Although the data contains no executable codes and cannot be run as a program, the NTF text can be read in an MS-DOS® environment.

OSCAR supply options

OSCAR is supplied in tiles which are referenced to the National Grid (see chapter 5).

The base unit for supply of OSCAR Asset-Manager and OSCAR Traffic-Manager is the 5 km by 5 km tile which corresponds to 5 km by 5 km divisions of the National Grid (NG). See figure 5.1 on page 30. National cover consists of 10 566 tiles.

Transfer format(s)

OSCAR is available in:

- BS 7567 (NTF v2.0 Level 3).

Media

OSCAR data in NTF – National Transfer Format – is supplied on the standard Ordnance Survey media range.

Update/update options

Both OSCAR Asset-Manager and OSCAR Traffic-Manager are updated twice a year, April and October. Each update is accompanied by details of changes since the previous supply. The last update is scheduled for April 2006.

OSCAR version numbering (or specification)

Each version and release of all OSCAR products is defined by a unique product version number and product release number which are reflected in this user guide. The product version number relates to the specification of the OSCAR data that is being supplied, and the product release number relates to the chronological data release. See chapter 6.

NTF release

The current version is NTF v2.0.

OSCAR output options

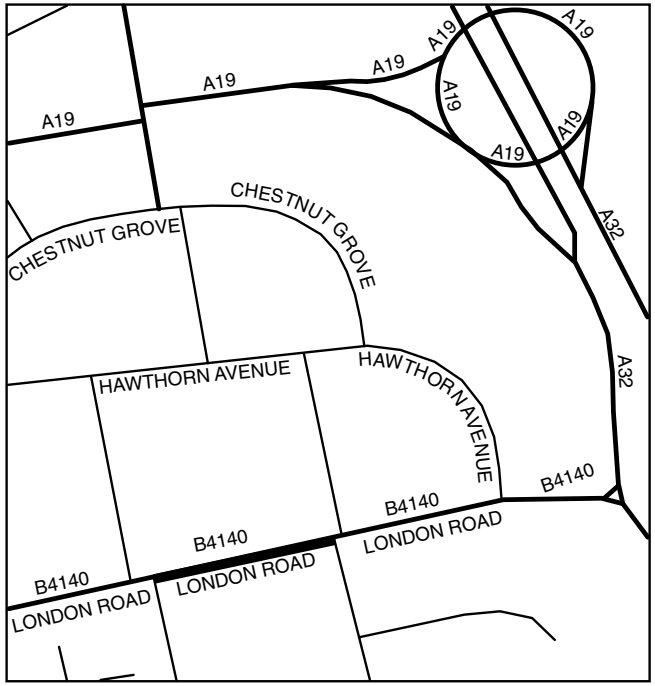
OSCAR is inert data. It requires software (not provided by Ordnance Survey) to display it on a screen, manipulate it, or plot it out as hard copy.

The parameters defining colours, line styles, text styles, symbols and so on should be built into your software.

The OSCAR product family may be customised by viewing or plotting at different scales or with different colours, line and text styles to suit your purpose. Certain classes of features may be omitted from customised maps on the basis of selection by feature code.

The resolution of OSCAR supports plotted or displayed output at a range of scales around the nominal scale of the source mapping.

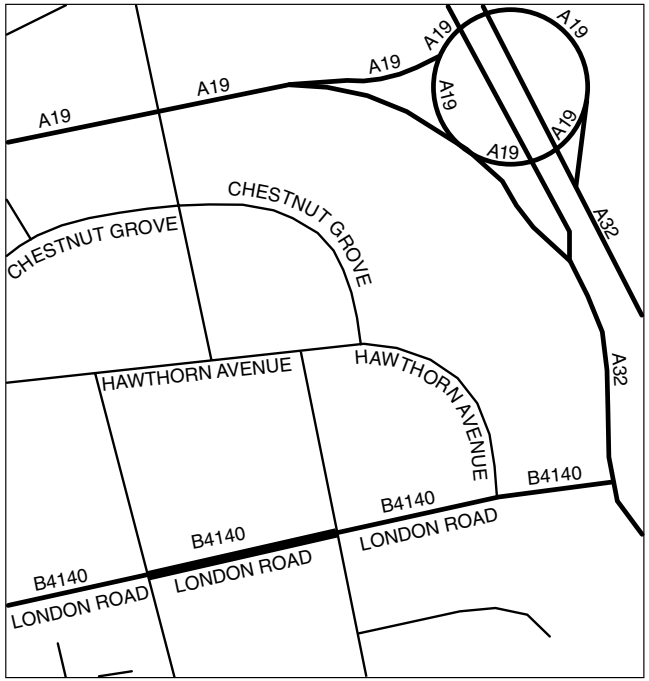
Figure 1.1: Representation of OSCAR Asset-Manager data showing some road name attributes and some DfT road number attributes.



The highlighted link has the following attributes:

PROPER_NAME	LONDON ROAD
ROAD_CLASS	3002
ROAD_NUM	B4140
LINE_LENGTH	110
OSODR	O198QYF5MF2FW
SOURCE	A

Figure 1.2: Representation of OSCAR Traffic-Manager data showing some road name attributes and some DfT road number attributes.



The highlighted link has the following attributes:

PROPER_NAME	LONDON ROAD
ROAD_CLASS	3002
ROAD_NUM	B4140
LINE_LENGTH	110
OSODR	O298QYF5MF2FW
SOURCE	A

Chapter 2 Data overview

Basic principles

The OSCAR product family is a range of highly specified digital road centreline products derived from a single definitive source. It is a representation in computer readable form of the national public road network as spatially defined by Ordnance Survey large-scale digital mapping.

GIS software provides the functionality to store, manage, and manipulate the digital map data. The properties of OSCAR make it suitable as the basis for users wishing to develop such applications. OSCAR is coordinated on the National Grid, which allows for the easy superimposition of other similarly referenced datasets.

The OSCAR product family is derived from Ordnance Survey's ROADS database and supplied as vector data in a link and node structure – where links are road centrelines and nodes are intersections of links – with attributes attached to each feature. Nodes are also supplied at the edge of each tile.

- OSCAR Asset-Manager provides around 3.5 million links nationally in 10 566 (5 km by 5 km) tiles.
- OSCAR Traffic-Manager provides over 3 million links in 10 566 (5 km by 5 km) tiles.

OSCAR data source

The source of the digital data in the ROADS database is the road centreline feature within our large-scale digital mapping database, Digital Database Management System (DDMS). Additional information was taken from 1:10 000 scale and other graphic mapping with an equivalent accuracy. The attributes attached to the link and node features are derived from primary sources collected by Ordnance Survey.

See chapter 4 for full information.

The database from which the OSCAR product family are derived is continually revised.

OSCAR data structure

In each OSCAR product, roads and the information associated with them are modelled into a network of links and nodes.

Links represent all public motorable roads and the majority of private motorable roads with public access in Great Britain. Each link has a feature code defining its road classification type.

Nodes represent all intersections of links, link ends, and the position where a tile edge cuts the link.

Links do not stop at tile edges, but will traverse those edges to make one contiguous line feature. Each line feature will, however, be made up of a number of link segments contained wholly within their respective tiles, and will be further identified by the tile and line reference records.

All links and nodes have a unique national reference number, the Ordnance Survey ROADS Database Reference (OSODR). This will uniquely identify any link or node within any OSCAR product. OSODRs are:

- a common and consistent location reference for all of Great Britain; and
- the basis for linking customer features to data.

Wherever possible the OSODR will remain unchanged on update, unless there is a geographic change to the feature, enabling consistent referencing to be created between successive releases of OSCAR.

Feature position

The centrelines in the parent database are positioned during survey but are not guaranteed as being absolutely central. The dataset is no more accurate than the source mapping. Digital mapping is an abstract representation of the real world and the road centreline does not represent a physical feature on the ground, therefore its shape is partly subjective.

The coordinates of the OSCAR Asset-Manager data are quoted to a resolution of 1 m.

- OSCAR Traffic-Manager is filtered with a 2 m lateral filter.

Links representing road centrelines in OSCAR Asset-Manager and OSCAR Traffic-Manager have sufficient accuracy to ensure they will fall within the road pecks (edge of road) as depicted on Ordnance Survey basic scale maps.

Feature codes

The geometry of links and nodes within OSCAR data would be meaningless unless they are assigned some distinguishing property.

Each feature is classified by means of a feature code (FC). These feature codes are allocated when each feature is initially interpreted and captured from source. Thus an A road is distinguished from a motorway by the feature code allocated to it. The feature code will be changed if the road is reclassified. Feature codes are listed in chapter 6.

Feature attribute data

An attribute is a descriptive characteristic of a feature, that is, a non-spatial element.

Attribute codes are fully described in chapter 6.

Text

There is no cartographic text in OSCAR. All textual information is held as attributes.

OSCAR application overview

Typical user scenarios

The OSCAR product family provides a digital representation of the road network that can be used for a variety of applications, including:

- routeing systems to calculate the shortest, fastest, or minimum junction routes, and give directions with street names and distances;
- emergency services systems for police beats, hospital locations, calculation of distances and positioning of fire stations and other infrastructure. To supply contacts, telephone numbers, and location of resources;
- efficient traffic control with data including infrastructure, accidents, and traffic flow to provide accurate and timely traffic and travel information to create smoother traffic movement and less congestion;
- utilising unique junction configuration for real-time routeing for in-car navigation applications;
- creating transport planning networks to evaluate highway and public transport schemes;
- routeing, scheduling, transport planning, and site location analysis for extensive regional or national requirements;
- displaying information about customers, policy holders, properties, development sites, patients, traffic incidents, and competitors against an accurate street map;
- planning salt spreading, snowploughing, street cleaning, refuse collection, postal delivery, and meter readings; or
- managing of road assets, street furniture positioning, road maintenance programming and cost evaluation.

Chapter 3 OSCAR explained

OSCAR data model

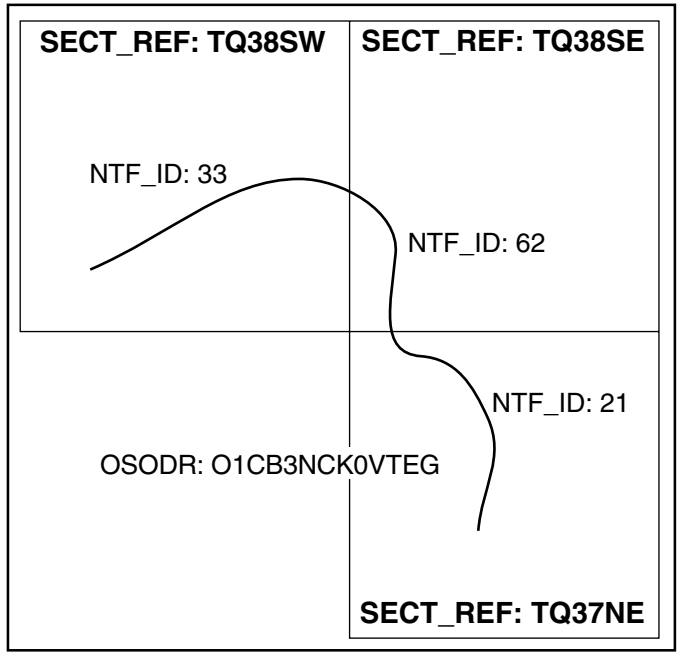
In the OSCAR database, the data is held in a seamless environment. However, Ordnance Survey edit in a tile-based environment and at present data is supplied to customers in 5 km by 5 km tiles.

Data structure

Links in a seamless database

Each link will relate to a distinct link within the OSCAR dataset. This link will not stop at tile edges, but will traverse those edges to make one contiguous line feature. This link will, however, be made up of a number of link segments, each of which will be contained wholly within an OSCAR product family tile.

Figure 3.1: Link examples.



In the example of OSCAR Asset-Manager shown above there will be one link with an Ordnance Survey ROADS Database Reference (OSODR) of O1CB3NCK0VTEG. This identifier will be unique throughout the whole OSCAR dataset. This link will be made up of three link segments with OSODRs of O1CB3NCK0VTEG. Each of these segments will be wholly contained within tiles, and will be further identified by the SECT_REF and NTF_ID of the constituent links.

Nodes in a seamless database

Each node will have an OSODR identifier which will be unique within the whole OSCAR dataset and product family.

Standard nodes will be where one or more link starts and/or ends. Edge nodes will appear in the data as a consequence of downloading the data in a tile format.

Details of features and attributes

A listing of all the features, attributes and their codes can be found in chapter 6.

Grade Separation

The Grade Separation attribute indicates the relative height relationship between intersecting links at a node, for example, bridges. It does not relate to ground surface level.

Junction Name

The Junction Name (JN) attribute indicates the junction number of motorway junctions, and the other classified roads at that junction. If the junction has no junction number, then that part of the junction name will not be supplied.

This information will be attached to a stand-alone node in OSCAR Asset-Manager. However, for OSCAR Traffic-Manager, this attribute will be attached to the node closest to the position of the junction.

This attribute only applies to nodes. If the node does not have a junction name, then this attribute will not be present.

Link Length

The Link Length (LL) attribute defines the length of the link in metres.

Private Roads

The Private Roads feature code defines publicly accessible private roads which are metalled and on private land. They are depicted on major industrial, educational, health or civic establishments where public access is normal. A separate feature code has been allocated to private roads which are not accessible to the public.

Pedestrianised Roads

The Pedestrianised Roads feature code defines roads or streets in city or town centres where traffic is banned.

Proper Name

The Proper Name (PN) attribute defines the road name associated with any link in the OSCAR dataset. If a link does not have a proper name then the attribute will not be present.

Road Number

The Road Number (RN) attribute defines the DfT road classification number which relates to a link. In the April 2004 release of OSCAR, the M6 Toll road has been included for the first time. The data structure has remained the same to minimise the impact on customers. The road, which is officially known as the 'M6Toll', has been named in the following format on the relevant links – M(T)6. The Junction Number (JN) format will remain the same with the T in brackets.

Trunk Road

If a link forms part of a trunk road, it will have the Trunk Road (TR) attribute attached.

Settlement Name

The Settlement Name (SN) attribute defines the name of a location or settlement. This name will be attached to a stand-alone node for OSCAR Asset-Manager. However, for OSCAR Traffic-Manager, this name will be attached to the node which is closest to the position of the location or settlement.

Source Scale

The Source Scale (SC) attribute defines the derivation of OSCAR data. This is the scale from which the individual link was derived for the OSCAR product. This attribute only applies to links and is present for all link features.

Chapter 4 Quality statement and specification

Source

OSCAR data was created from the latest Land-Line data where it was available. In areas which had no digital cover, the required data was captured by digitising centrelines from 1:10 000 scale derived or basic scale graphic sheets.

A brief history of OSCAR

- Initial data capture for OSCAR was completed in December 1993.
- In April 1994 OSCAR was launched as OSCAR Asset-Manager.
- To meet the increasing demand in traffic and travel applications, OSCAR Traffic-Manager was released in November 1995 and had an attribute database (Address-Ranges) made available in 2000.

Currency

OSCAR data is derived from the latest version of Land-Line. Any changes to road information within Land-Line are incorporated in each update sweep of OSCAR. The ROADS database is continuously revised and updated.

The currency of the Land-Line data is controlled by the revision criteria for topography defined by Ordnance Survey for the various geographic areas.

Information on new and amended classified roads is obtained from the relevant highways authority through Ordnance Survey's Mapping Intelligence.

Specification

Features

- Motorways
- A roads
- B roads
- minor roads
- private roads
- pedestrianised streets

Topology

- links
- nodes

Attributes (links)

- OSODR
- classification
- name
- DfT number
- trunk road
- form of way
- multi-carriageways
- roundabouts
- slip roads
- source scale
- road length

Attributes (nodes)

- OSODR
- junction name – motorways
- logical or edge
- settlement name
- grade separation

Optional database for OSCAR Traffic-Manager:

- Address-Ranges

Ordnance Survey ROADS Database Reference (OSODR)

Formerly known as Ordnance Survey OSCAR Database Reference, hence the abbreviation, the name has been changed in line with the renaming of the database. The existing abbreviation has been retained to minimise confusion.

The OSODR (OD) attribute defines the Ordnance Survey ROADS Database Reference (OSODR). This will uniquely identify any link or node within the national OSCAR dataset. The OSODR will be used as the unique identifier for each link and node, rather than the NTF identifiers. The NTF identifiers will be unique within each tile that is supplied, but will not be maintained between supplies.

A road object is part of a road between nodes (junctions) uninterrupted by tile or map edges.

An OSODR refers not just to a single link but may refer to many links that make up a road object – which may be chained together across tile edges. Thus, on adjoining tiles, there may be two or more links with the same OSODRs. This attribute applies to links and nodes. It will be present for all features.

An OSODR has been assigned to all existing features (links and nodes) in the OSCAR database. Any features which are new to ROADS after the initial allocation will be assigned an OSODR when they are loaded to the database.

The OSODR for a feature will never be modified – only created and deleted. However, there may be many changes to a feature with a specific OSODR during the lifetime of that OSODR allocation. There are two reasons for changes. These are:

1 The coordinates of the feature may move within a specified tolerance – currently 3 m either side of a link, 10% of its length, and 5 m movement of any node.

2 The attributes associated with a feature may change. Any changes to these attributes will not affect the OSODR allocated to that feature.

The following attributes may change for link features:

- feature code
- length of link
- road name
- road number
- trunk road indicator
- source scale
- form of way

The following attributes may change for node features:

- direction of links at node
- feature code
- junction name
- number of links at node
- level of link at node
- settlement name

If a feature moves by more than the specified tolerance, then the OSODR for the feature will be deleted and a new OSODR allocated to that feature. If a feature is deleted from the OSCAR dataset, then the OSODR allocated to that feature will cease to exist and will not be reallocated.

Accuracy and resolution

- OSCAR Asset-Manager is supplied to 1 m resolution, this means that the data will fall within the road carriageway as defined in Land-Line, unless derived from a source of 1:10 000 scale or greater.
- OSCAR Traffic-Manager has a 2 m lateral filter applied to the centreline which is supplied to 1 m resolution. The 2 m filter does not affect the positional accuracy of node points but allows for the straightening of alignments between nodes. The data will still fall within the road carriageway, unless derived from a source of 1:10 000 scale or greater.

During the updating of OSCAR data there is a comparison buffer created – around the existing OSCAR data – to detect change. This buffer is set to 3 m either side of a feature, 5 m at each end, and 10% of the length.

Any new features which touch or fall outside of the buffer will be considered as altered features.

The original reference for features will be maintained across updates if the features remain unaltered.

Completeness

Throughout the whole OSCAR production process there are many checks and validation procedures carried out to ensure that the data supplied to customers provides a high standard of accuracy and completeness. These checks take the form of:

- visual checks
- computer validation:
  - within the flowline; and
  - using commercially available software.

As well as these checks each time a component part of a tile is compared for update, discrepancies are flagged for investigation.

Whilst Ordnance Survey makes every effort to ensure that all roads, features and attributes are complete, it cannot guarantee that the latest release of OSCAR contains all roads in Great Britain. The roads featured in the data are those which have been surveyed and put into road classifications by Ordnance Survey surveyors and updated within the Ordnance Survey data archive.

Chapter 5 OSCAR tile numbering and the National Grid

The National Grid provides a unique reference system that can be applied to all Ordnance Survey maps of Great Britain, at all scales.

Great Britain is covered by 100 kilometre grid squares with each square identified by two letters.

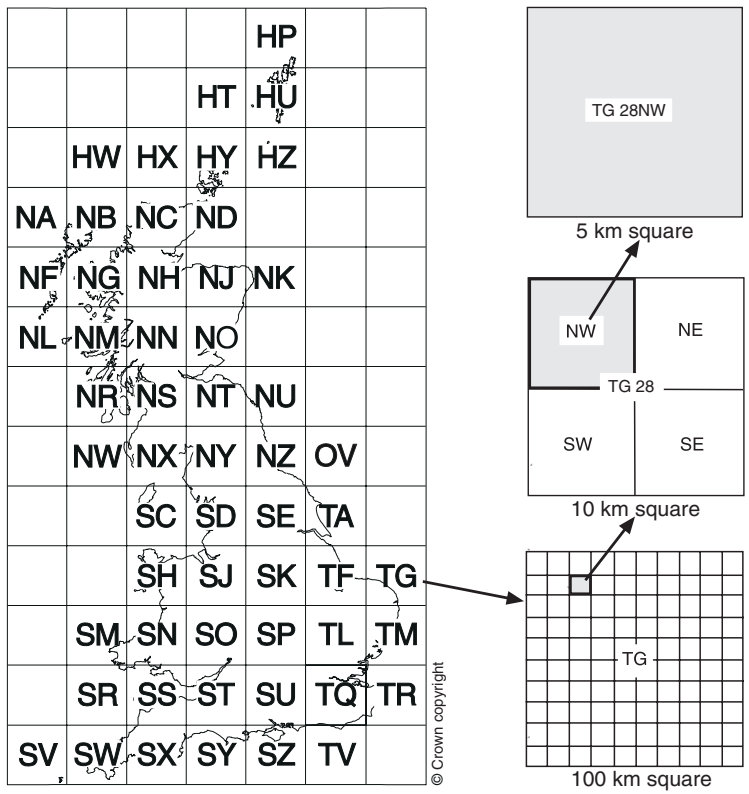


Figure 5.1: Each National Grid square of 100 km by 100 km contains 400 (5 km by 5 km) squares. OSCAR Asset-Manager and OSCAR Traffic-Manager are supplied to customers in 5 km by 5 km tiles. These are referenced by National Grid letters followed by the appropriate numbers and figures which obey the 1:10 000 scale sheet numbering convention.

Chapter 6 NTF explained

An overview of OSCAR in NTF

OSCAR data is supplied in the British Standard national format common to the majority of Ordnance Survey's digital map data products; namely NTF, and is transferred in Level 3 as variable length records. An overview of the data structure of an OSCAR data file is shown on page 34 in diagrammatic form. The convention used for this diagram is in the industry standard adopted for Jackson Structured Programming (JSP).

The British Standard for BS 7567 (NTF v2.0) stipulates the following for Level 3:

This level supports a variety of data models that may include network data, polygons, semantic relationships and complex features – for example, a school consisting of its buildings and playing fields.

This level is designed for:

- transferring basic geometry and simple features through the use of geometry and feature records;
- relating basic geometrical and topological elements to one or more features through the use of chain, polygon, and complex line records;
- combining features to form complex features through the use of collection and complex polygon records;
- using text records both to relate text strings to features and cartographic output; and
- referencing and positioning external features, for example, raster data. The record structure at this level may also be defined to be compatible with data in Levels 1 and 2.

The governing body for the industry standard NTF is now the British Standards Institution (BSI).

Their address is:

389 Chiswick High Road
LONDON
W4 4AL
Phone: 020 8996 9000
Fax: 020 8996 7001

NOTE: Full details of the British Standard can be accessed through the British Standards Institution's web site at:

http://www.bsi-global.com.

Any queries relating to the OSCAR products should be referred to Ordnance Survey at the address shown at the beginning of this user guide.

Conventions used in this user guide

Certain conventions are adopted as an aid to interpretation. In some cases the convention is dropped where the context is self evident.

[ ] Square brackets are placed around record names, for example, [SECHREC].

{ } A pair of braces denote field names, for example, {FEAT-CODE} is the feature classification code.

[ ] 90 A two digit number following square brackets denotes the record descriptor which uniquely identifies the record name between brackets.

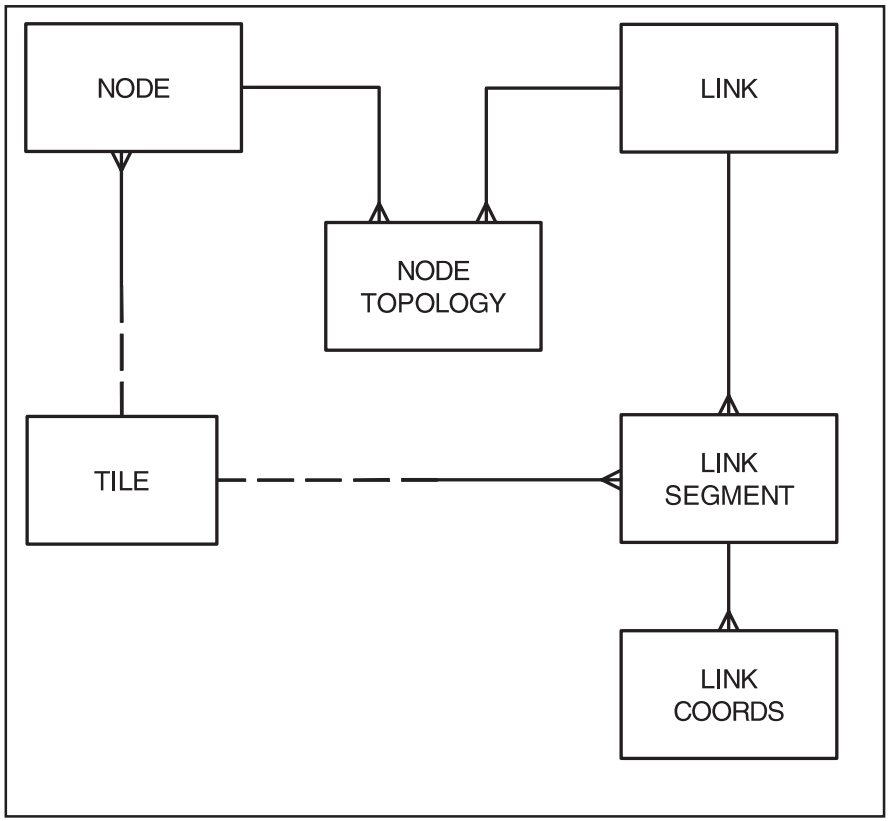
<S> This is the space character (ASCII code 32).

<3S> This denotes three successive space characters.

% The percentage character (ASCII code 37).

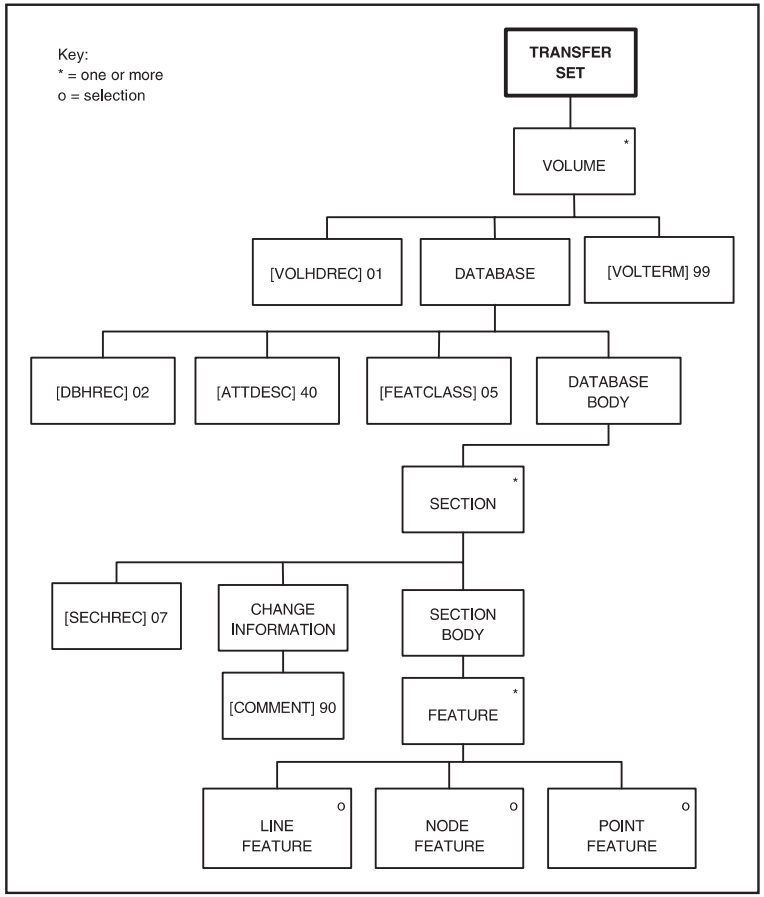
| This indicates a repeating field (ASCII code 124).

Data model



Jackson structure

Figure 6.1: depicts an example of an OSCAR file. No fixed record sequence or relationship is implied.



Version management

Product version

Each version of OSCAR is defined by a unique product specification. The product version number can be found in OSCAR data in the {FCNAME} field of the Database Header Record [DBHREC].

The product version number takes the form xx.yy, where xx is the major product number and yy is the minor change number. Thus version 03.02 would indicate that this is major product version 3, and contains the second minor amendment to the product specification.

This user guide reflects the product specification current at the time of its production. The effective date of this product specification is 1 January 1994 and is indicated by the {FCDATE} field of the Database Header Record [DBHREC].

Product release

Each release of OSCAR is defined by a unique reference number. The product release number appears in the Database Header Record [DBHREC] in the field {DBNAME}.

The product release number takes the form xx.yy, where xx is the is the sequential release within a year and yy is the year of the release. Thus release 01.01 would indicate that this is the first data release in 2001.

The copyright date of each release is the same as date of extraction from the database {SURV_DATE} and is shown in each Section Header Record [SECHREC] in the {COPYRIGHT} field.

Six-monthly releases do not usually also mean a change of product specification.

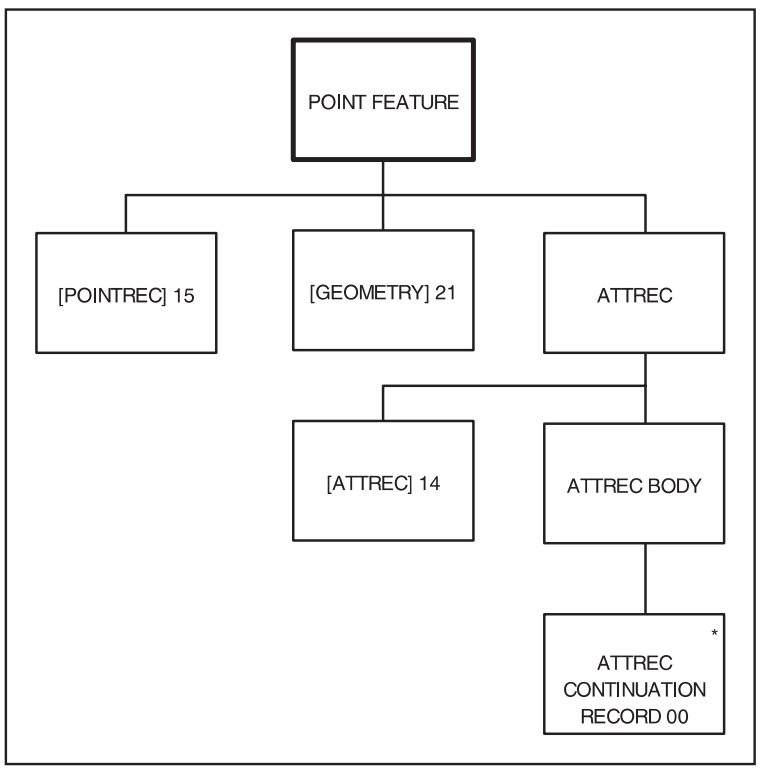
NTF version

The current version is NTF v2.0 Level 3 and will be supplied until further notice. The NTF version is indicated by the {NTFVER} field of the Volume Header Record [VOLHDREC]. The effective date of the definition of NTF v2.0 in OSCAR is 15 May 1992 and is indicated by the {DDATE} field of the Database Header Record [DBHREC].

OSCAR information relevant to NTF

Point features

Point features exist at the junction or end of links; in OSCAR Asset-Manager and OSCAR Traffic-Manager they also exist for motorway junction names and settlement names. The point feature gives a position and attribute to the corresponding node.

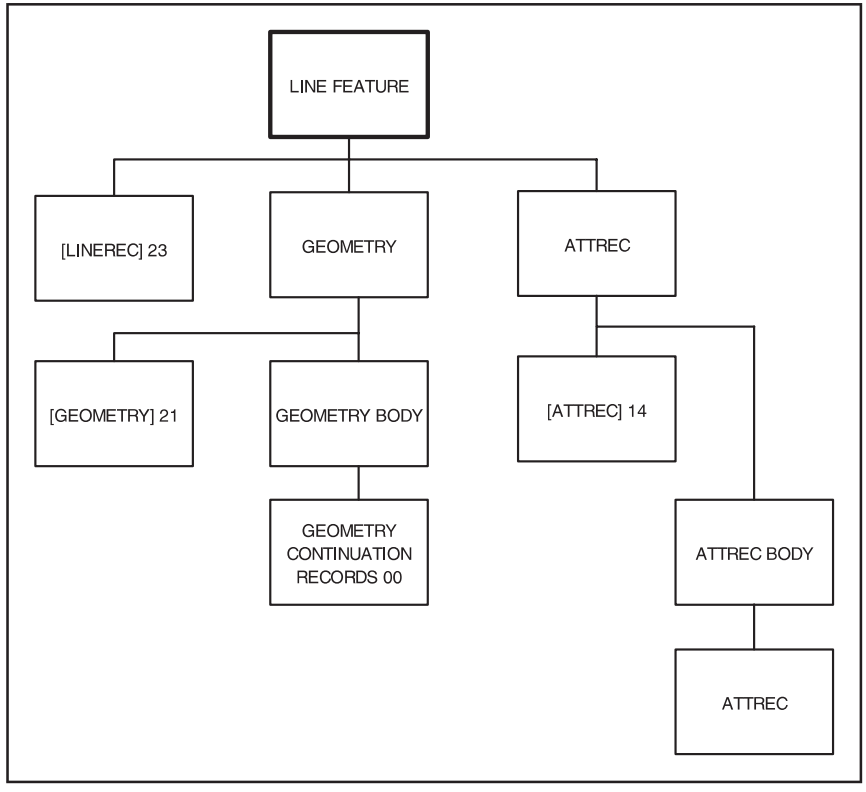


Line features

All line features are broken when they intersect one another, where attributes change or at tile edges.

The first and last coordinate pairs in a line will correspond exactly with the start or end coordinates of any adjoining line(s).

A line cannot cross from one tile to the next, but see OSODR definition in chapter 4.



Coordinates

Coordinate values and the number of coordinate pairs in a feature are transferred in the Geometry Record [GEOMETRY1].

All coordinates within the data are expressed as strings of numeric characters for the eastings and the northings. The size of these character strings, for both eastings and northings is four characters.

Where appropriate, leading zeros will be present to complete the length of the coordinate field.

The eastings {X_COORD} and northings {Y_COORD} are separate fields and therefore coordinate pairs can be split across records, although the integrity of the fields themselves is not compromised.

All coordinates are measured from the local origin, which is the south-west corner of the tile. To convert coordinate data to full National Grid coordinates, add the coordinates of the feature to those of the SW corner of the tile. The SW corner coordinates are contained within the {X_ORIG} and {Y_ORIG} fields of the Section Header Record [SECHREC].

Change information

Change information will be supplied as part of the NTF dataset. This information will be transferred in the Comment Records [COMMENT].

The change information will define the NTF record type that has changed since the last release of the product, using the {REC_DESC} of the corresponding record. Change information will be indicated for [POINT] 15, [NODE] 16 and [LINE] 23 records.

The {RECORD_ID} will indicate the OSODR of the record that has changed.

The {CHANGE_TYPE} will indicate the type of change that has occurred to that feature. This may be:

- D (deleted);
- I (inserted – new record); or
- U (updated – changed).

Attribute codes

Attribute codes provide supplementary information for a feature, providing such qualifying information as feature code, feature name and so on.

In NTF the structure of user-defined attributes is described in the Attribute Description Record [ATTDESC].

The actual attribute detail for a record is in the Attribute Record [ATTREC].

Not all the defined attributes may be applicable to all features, and thus not all possible attributes will necessarily be defined in an attribute record, see Attribute allocation in this chapter.

Feature and record IDs

The identifying fields for each record, for example, {NODE_ID} for [NODE] records, {LINE_ID} for [LINE] records and so on, are unique within each individual dataset. They are not guaranteed to be maintained between supplies.

The OSODR attribute, which is linked to each line and node record, will be a unique reference within the entire national OSCAR dataset. These references will be maintained between supplies, except where there has been significant change to a feature; see chapter 4 for a more detailed explanation of OSODR allocation. The OSODR is used in the change information records to indicate what features have changed between supplies.

Data classification and metadata

Form of way (FW)

The FW attribute is used to define the type of road feature which the link represents. This is in addition to the feature code, and may be applied to any link record. Only one form of way will apply to any link record. The form of way values are utilised primarily as an aid to produce other, lower resolution, Ordnance Survey data sets. The following are Ordnance Survey definitions (and should not be confused with any other definitions of these features):

D indicates that the link forms part of a multi-carriageway. This means that as well as being used for dual carriageways, it is also used for complex junctions where there are two carriageways separated by a physical barrier.

R indicates that the link forms part of a roundabout. Roundabouts with this attribute have a physical obstruction in the road, and do not include mini-roundabouts which are painted on the road. This attribute will not be included in gyratory systems, which are interpreted as separate roads and not roundabouts.

S indicates a road junction link or slip road.

Junction name (JN)

This attribute is used to indicate the junction number of motorway junctions, and the other classified roads at that junction. The junction name is variable length text, and will be in the format M6 J10A, where M6 is the DfT road number and J10A indicates that this is junction 10A of the M6.

There could be any number of roads at a junction; therefore each classified road at that junction may be repeated in the junction name attribute. Each road number and junction will be separated by a forward slash (/) character. The following is an example of a junction name attribute:

M40 J1/A40/A413/A4020

This attribute only applies to nodes. If the node does not have a junction name or number, then this attribute will not be present.

This information is attached to a stand-alone node in OSCAR Asset-Manager. For OSCAR Traffic-Manager, this information is attached to a node that forms part of the junction.

Line length (LL)

This attribute defines the length of the link in metres and will be present for all link records. It is calculated from the planimetric coordinates making up the link and does not take into account the effect of slope. The link length in all products refers to the length as recorded in the ROADS database.

OSODR (OD)

The OSODR (OD) attribute defines the Ordnance Survey ROADS Database Reference (OSODR). This will uniquely identify any link or node within the national OSCAR dataset. The OSODR will be used as the unique identifier for each link and node, rather than the NTF identifiers. The NTF identifiers will be unique within each tile that is supplied, but will not be maintained between supplies.

A road object is part of a road between nodes (junctions) uninterrupted by tile or map edges.

An OSODR refers not just to a single link, but may refer to many links that make up a road object – which may be chained together across tile edges. Thus, on adjoining tiles, there may be two or more links with the same OSODRs. This attribute applies to links and nodes. It will be present for all features.

An OSODR has been assigned to all existing features (links and nodes) in the ROADS database. Any features which are new to OSCAR after the initial allocation will be assigned an OSODR when they are loaded to the database.

Proper name (PN)

The proper name (PN) attribute defines the road name associated with any link in the OSCAR dataset. If a link does not have a proper name then the attribute will not be present. Where the road is otherwise not named and part of a named estate, the estate name will be allocated to the road.

Road number (RN)

This attribute defines the DfT road classification number which relates to a link. If a road is not classified then this attribute will not be present.

Source scale (SC)

This attribute indicates the derivation of OSCAR data. The following source scale attributes are used in the NTF attribute records:

Definition	Value
1:1250, 1:2500 or 1:10 000 scales digital	A
1:10 000 scale graphic	B
1:50 000 scale	C
1:100 000+ scales	D

Settlement name (SN)

The settlement name (SN) attribute defines the name of a location or settlement. This name will be attached to a stand-alone node for OSCAR Asset-Manager. However, for OSCAR Traffic-Manager this name will be attached to the node which is closest to the position of the location or settlement. There are about 30 000 settlement names derived from 1:250 000 scale data.

Trunk roads (TR)

If a link forms part of a trunk road, then it will have a trunk road attribute (TR) with a value of Y.

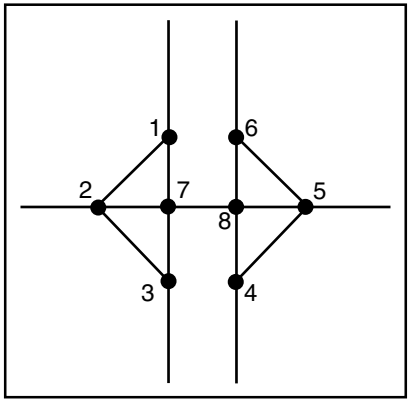
Grade separation

The grade separation attribute indicates the relative height relationship between intersecting links at a node, for example, bridges. It does not relate to ground surface level.

Figure 6.2: Example of a junction.

The example consists of a multi-carriageway running north–south, crossed by a single carriageway running east–west, with four slip roads providing access between the two, and the single carriageway carried on a bridge over the multi-carriageway.

There are eight nodes (numbered 1 to 8 in figure 6.2). Using the {LEVEL} field in the Node Record 16, nodes 7 and 8 will show a level 0 for the multi-carriageway links and a level 1 for the single carriageway. Nodes 1 to 6 will show a level 0 for all links.



NTF attributes

The following attributes are used in the supply of OSCAR Asset-Manager and OSCAR Traffic-Manager data:

Mnemonic	Name	Description
FC	Feature code	Feature code for the feature
FW	Form of way	Form of way descriptor for a link
JN	Junction name	Name of junction at node
LL	Line length	Length of a link, in metres
OD	OSODR	Unique id for a link or node
PN	Proper name	Road name for a link
RN	Road number	DfT road number for a link
SC	Source scale	Scale of data from which the OSCAR link was derived
SN	Settlement name	Name of settlement
TR	Trunk road	Whether a link is a trunk road

Attribute allocation

Not all attributes are applicable to all features and, therefore, some attributes may not be present in certain attribute records.

OSCAR Asset-Manager and OSCAR Traffic-Manager use the following attributes.

These attributes are **compulsory,** and will always be present:

- **Line attributes** FC, LL, OD, SC
- **Node attributes** FC, OD

These attributes are optional, and may be present in any combination:

- **Line attributes** FW, PN, RN, TR
- **Node attributes** JN, SN

See appendix B for information on OSCAR Traffic-Manager with Address-Ranges.

Feature code (FC) allocations and descriptions

The feature code (FC) attribute defines the type of feature which the link, point or node record represents.

The following feature codes are used in NTF for supply of OSCAR products to represent or depict:

FC 3000	Motorways.
FC 3001	Roads classified by the DfT as A roads.
FC 3002	Roads classified by the DfT as B roads.
FC 3004	Minor or other roads which form part of the highway network, including C roads.
FC 3007	Non-network roads. These are roads which do not form part of the current highway network. For example, this could be applied to roads on new estates which have not yet been connected to the main highway network.
FC 3008	Private roads which are not accessible by the public. These roads will be on private land and will be metalled. Examples of such roads are those used for access to military establishments, farm and forestry roads.
FC 3009	Private roads which are publicly accessible. These roads will be on private land and will be metalled. Examples of such roads are those used for access to major industrial, educational, health or civic establishments where public access is the norm.
FC 3010	Pedestrianised roads. This will relate mainly to roads or streets in city or town centres where traffic is banned, where access is permitted to public transport, emergency services or delivery vehicles.
FC 3500	A standard node. These nodes will be located wherever two or more links meet, that is, at the junction of roads. They also exist in OSCAR Asset-Manager for motorway junction names and settlement names.
FC 3501	An edge node. These nodes will be located wherever a road link crosses the edge of an NTF tile. They are only supplied for completeness in NTF, and are not part of the national OSCAR dataset. An edge node will never be positioned at the junction of two roads.

Transfer set structure

OSCAR data is in one or more transfer sets.

A transfer set normally equates to a single file except where continuation volumes are used when the transfer set exceeds the capacity of the media.

Volume records

Each transfer set starts with a Volume Header Record [VOLHDREC] and terminates with a Volume Terminator Record [VOLTERM].

Database records

The beginning of each transfer set is structured with the following introductory or leading records:

1 Database Header Record [DBHREC] – this gives details of:

- the database name;
- NTF release date;
- feature classification table name; and
- the date of the data specification.

2 Attribute Description Record [ATTDESC] – this lists and gives a description of the attributes that are applied to features within the transfer set.

3 Feature Classification Record [FEATCLASS] – this lists and gives descriptions of all possible feature codes for the transfer set.

These introductory records are followed by the data.

Section records

This section consists of two parts:

1 Section Header Record [SECHREC] – this gives the National Grid coordinates of the section and on unformatted media informs you that a new section is starting.

2 Section body – this comprises all the features within the section.

Section body data

Line feature

Each line feature is represented by the use of the following records:

Description in NTF	
LINE RECORD	LINEREC
GEOMETRY RECORD [LINE]	[GEOMETRY1]
ATTRIBUTE RECORD	[ATTREC]

Each line feature is in the data only once. There is one Attribute Record to each line record.

Node feature

Each node feature is represented by the use of the following records:

Description in NTF	
POINT RECORD	[POINTREC]
GEOMETRY RECORD [NODE]	[GEOMETRY1]
ATTRIBUTE RECORD	[ATTREC]
NODE RECORD	[NODEREC]

Each node feature is in the data only once. There is one Attribute Record to each Point Record. There is one Geometry Record, referenced by both the Point Record and the Node Record. The Node Record references one or more Line Geometry Records.

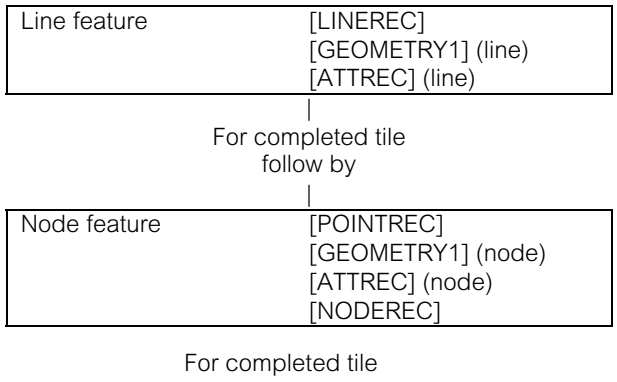
Section body records

The Geometry Record [GEOMETRY] contains the coordinate position(s) of the feature. Node and point features contain one coordinate pair, line features contain two or more pairs.

Geometry continuation records contain any further coordinates required to complete a line feature.

How the section body is arranged

NOTE: NTF is designed to transfer any geographic data; therefore there is no standard order of records. This description of the order of records is specifically for the transfer of OSCAR data but cannot be guaranteed to be maintained.



Data supply structure

Supply of data on formatted media

Data supplied on CD-ROM or other logically formatted media is not blocked but is written directly to the output device.

The transfer set has one dataset and one section. One or more transfer sets are put onto the medium.

If your order is larger than the capacity of the medium, it is put onto two or more of that media.

Continuation volumes are only used if a transfer set is larger than the capacity of the medium.

Formatted media (transfer set less than media capacity)

01	VOLUME HEADER RECORD	01	
02	DATABASE HEADER RECORD		
40	ATTRIBUTE DESCRIPTION RECORD		
07	SECTION HEADER RECORD		
	Tile 1 data		
99	VOLUME TERMINATION RECORD		*
01	VOLUME HEADER RECORD	01	
02	DATABASE HEADER RECORD		
40	ATTRIBUTE DESCRIPTION RECORD		
07	SECTION HEADER RECORD		
	Tile 2 data		
99	VOLUME TERMINATION RECORD		*
	and so on		
	Tile n data		
99	VOLUME TERMINATION RECORD		*

```
*     '99End Of Transfer Set0%'
```

Formatted media (transfer set greater than media capacity)

01	VOLUME HEADER RECORD	01
02	DATABASE HEADER RECORD	
40	ATTRIBUTE DESCRIPTION RECORD	
05	FEATURE CLASSIFICATION RECORD	
07	SECTION HEADER RECORD	
	Part tile 1	
07	VOLUME TERMINATION RECORD	

**

```
**'99 End of Volume 01 Transfer Set'
     'Continues On Volume 02 1%'
```

01	VOLUME HEADER RECORD	02
	Remainder tile 1 data	
99	VOLUME TERMINATION RECORD	

*

01	VOLUME HEADER RECORD	01
02	DATABASE HEADER RECORD	
40	ATTRIBUTE DESCRIPTION RECORD	
05	FEATURE CLASSIFICATION RECORD	
07	SECTION HEADER RECORD	
	Tile 2 data	
99	VOLUME TERMINATION RECORD	

*

```
*     '99End Of Transfer Set0%'
```

Chapter 7 Record structures for the transfer of OSCAR in NTF

NTF record list

This list comprises the valid record types used in the OSCAR product family NTF transfer set.

Descriptor	Description	Record name
01	Volume Header Record – defines the donor and data type.	[VOLHDREC]
02	Database Header Record – transfers data about the database.	[DBHREC]
05	Feature Classification Record – defines data classifications.	[FEATCLASS]
07	Section Header Record – defines coordinate and structure types, unit scale, factors and so on.	[SECHREC]
14	Attribute Record – defines the attributes for line and point records.	[ATTREC]
15	Point Record – identifies the definition of node points.	[POINTREC]
16	Node Record – defines the topological relationship between links and nodes.	[NODEREC]
21	Two-Dimensional Geometry Record – defines the two-dimensional geometry for a link or node.	[GEOMETRY1]
23	Line Record – identifies the definition of a link.	[LINEREC]
40	Attribute Description Record – defines attribute descriptions and their fields.	[ATTDESC]
90	Comment Record – transfers change information or information about empty tiles.	[COMMENT]
99	Volume Termination Record – defines the end of the transfer set.	[VOLTERM]

NOTE: REC_DESC = record descriptor

See appendix B for information on NTF records for OSCAR Traffic-Manager when supplied with Address-Ranges.

Volume Header Record [VOLHDREC] 01

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	01	
DONOR	03:22	A20	ORDNANCE SURVEY<5S>	
RECIPIENT	23:42	A20	<20S>	Not used.
TRANDATE	43:50	DATE	YYYYMMDD	Date of processing.
SERIAL	51:54	I4	0000	Not used.
VOLNUM	55:56	I2	01	Incremented for each volume.
NTFLEVEL	57:57	I1	3	
NTFVER	58:61	R4.2	0200	Version 2.0.
NTFOR	62:62	A1	V	Variable length records.
EOR	63:63	A1	<S>	On formatted media.
DIVIDER	64:64	A1	\	Terminates variable length text fields.
CONT_MARK	65:65	I1	0	No further records.
EOR	66:66	A1	%	Record terminator.

Record example:

```
 01 ORDNANCE SURVEY                          19951107000001302OOV \0%
      |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

Template

Database Header Record [DBHREC] 02

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	02	
DBNAME	03:22	A20		Database name – see note 1.
DDNAME	23:42	A20	DEFAULT_02.00<7S>	
DDATE	43:50	DATE	19920515	Release date of NTF version being use used.
DDBASE	51:70	A20	<20S>	Not used.
DDBDATE	71:78	DATE	00000000	Not used.
CONT_MARK	79:79	I1	1	Continuation record.
EOR	80:80	A1	%	Record terminator.

Continuation of Database Header Record

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	00	
FCNAME	03:22	A20		Data specification – see note 2.
FCDATE	23:30	DATE	19940101 – in OSCAR Asset-Manager only see note 3	Date of data specification.
DQNAME	31:50	A20	<20S>	Not used.
DQDATE	51:58	DATE	00000000	Not used.
DATA MODEL	59:60	I2	00	Not used.
CONT_MARK	61:61	I1	0	No further records.
EOR	62:62	A1	%	Record terminator.

Record example:

```
02OSCAR_ASSET_01.01   DEFAULT_02.00       19920515                    000000001%
00OSCAR_ASSET_01.01   19940101                      00000000000%
```

```
     |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
```

Template

Note 1: DBNAME will indicate the release number. For example, it could be OSCAR_ASSET_, followed by the release number in the format xx.yy. See Version management, chapter 6.

Note 2: FCNAME will indicate the product version number. For example, it could be OSCAR_ASSET_, followed by the product version number in the format xx.yy. See Version management, chapter 6.

Example of valid contents of DBNAME and FCNAME fields:

Product	DBname	FCname
OSCAR Asset-Manager	OSCAR_ASSET_02.01<3S>	OSCAR_ASSET_01.01<3S>
OSCAR Traffic-Manager	OSCAR_TRAFFIC_01.01<S>	OSCAR_TRAFFIC_01.01<S>

Note 3: In OSCAR Traffic-Manager this date is 19990401.

Feature Classification Record [FEATCLASS] 05

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	05	
FEAT_CODE	03:06	A4		Feature classification code.
CODE_COM	07:16	A10	<10S>	Not used.
STCLAS	17:36	A20	<20S>	Not used.
FEATDES	37: *	A*		Description of feature class.
DIVIDER	*:*	A1	\	
CONT_MARK	*:*	I1	0	No further records.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
053000                          Motorway\0%
053001                          A Road\0%
053002                          B Road\0%
053004                          Minor Road\0%
053007                          Non Network Road\0%
053008                          Private Road\0%
053009                          Private Road (Publicly Used)\0%
053010                          Pedestrianised Road\0%
053500                          Standard Node\0%
053501                          Edge Node\0%
```

```
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |         |         |         |         |         |         |         |         |
```

Template

Section Header Record [SECHREC] 07

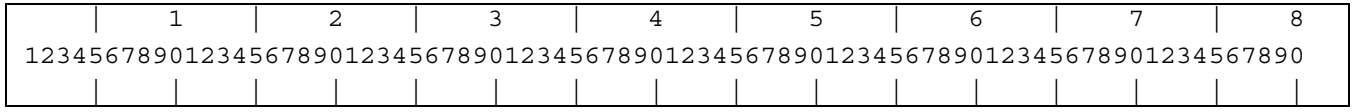
Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	07	
SECT_REF	03:12	A10		Tile reference.
COORD_TYP	13:13	I1	2	Defines rectangular coordinates.
STRUC_TYP	14:14	I1	1	Defines vector data.
XYLEN	15:19	I5		Redefines X_COORD, Y_COORD.
XY_UNIT	20:20	I1	2	Defines units as metres.
XY_MULT	21:30	R10.3	0000001000	Multiplies coordinates by 1.000.
ZLEN	31:35	I5	00000	
Z_UNIT	36:36	I1	0	
Z_MULT	37:46	R10.3	0000001000	Multiplies coordinates by 1.000.
X_ORIG	47:56	I10		Eastings of origin.
Y_ORIG	57:66	I10		Northings of origin.
Z_DATUM	67:76	I10	0000000000	Not used.
CONT_MARK	77:77	I1	1	Continuation record.
EOR	78:78	A1	%	Record terminator.

Continuation of Section Header Record

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	00	
XMIN	03:12	I10	0000000000	Minimum eastings.
YMIN	13:22	I10	0000000000	Minimum northings.
XMAX	23:32	I10		Maximum eastings.
YMAX	33:42	I10		Maximum northings.
XY_ACC	43:47	R5.2	00000	Not used.
Z_ACC	48:52	R5.2	00000	Not used.
SURV_DATE	53:60	DATE	YYYYMMDD	Date of extraction from database.
LAST_AMND	61:68	DATE	00000000	Default – not used.
COPYRIGHT	69:76	DATE		Same as SURV_DATE.
CONT_MARK	77:77	I1	0	No further records.
EOR	78:78	A1	%	Record terminator.

Record example:

```
07TQ38SW    2100004200000010000000000000001000000053000000001800000000000001%
00000000000000000000000000005000000000500000000000001994010700000000199401070%
```



Template

Valid section header values for OSCAR products:

Product	Sect ref	XYLEN	XMAX & YMAX
OSCAR Asset-Manager	AAAAAA<4S>	00004	0000005000
OSCAR Traffic-Manager	AAAAAA<4S>	00004	0000005000

Attribute Record [ATTREC] 14

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	14	
ATT_ID	03:08	I6		Unique id for record.
VAL_TYPE	09:10	A2	OD	
VALUE	11:23	A13		Unique id (OSODR) for link.
VAL_TYPE	24:25	A2	FC	
VALUE	26:29	I4		Feature code.
VAL_TYPE	*:*	A2	SC	
VALUE	*:*	A1		Source scale.
VAL_TYPE	*:*	A2	LL	
VALUE	*:*	I5		Length of link.
VAL_TYPE	*:*	A2	PN	
VALUE	*:*	A*		Road name.
DIVIDER	*:*	A1	\	
VAL_TYPE	*:*	A2	RN	
VALUE	*:*	A*		Road number.
DIVIDER	*:*	A1	\	
VAL_TYPE	*:*	A2	TR	
VALUE	*:*	A1		Trunk road indicator.
VAL_TYPE	*:*	A2	FW	
VALUE	*:*	A1		Form of way.
CONT_MARK	*:*	I1	0 or 1	No further records or continuation record follows.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
14000001ODO138UHK0PLWAXFC3001SCALL00342PNCOMMERCIAL STREET\RNA315(T)\TRYFWD0%
```

```
      |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      |          |          |          |          |          |          |          |
```

Template

Attribute Record [ATTREC] 14

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	14	
ATT_ID	03:08	I6		Unique id for record.
VAL_TYPE	09:10	A2	OD	
VALUE	11:23	A13		Unique id (OSODR) for node.
VAL_TYPE	24:25	A2	FC	
VALUE	26:29	I4		Feature code.
VAL_TYPE	*:*	A2	JN	
VALUE	*:*	A*	Junction name.	
DIVIDER	*:*	A1	\	
VAL_TYPE	*:*	A2	SN	
VALUE	*:*	A*		Settlement name.
DIVIDER	*:*	A1	\	
CONT_MARK	*:*	I1	0 or 1	No further records or continuation record follows.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
14000023ODO1DF42CK0VTEGFC3500JNM27 J2\SNSOUTHAMPTON\0%
```

```
     |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |    |     |    |     |    |     |    |     |    |     |    |     |    |     |    |
```

Template

Point Record [POINTREC] 15

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	15	
POINT_ID	03:08	I6		Unique id.
GEOM_ID	09:14	I6		Reference to point geometry.
NUM_ATT	15:16	I2	01	Number of ATTRECs.
ATT_ID	17:22	I6		Reference to ATTREC.
CONT_MARK	23:23	I1	0	No further records.
EOR	24:24	A1	%	Record terminator.

Record example:

```
150000040000060100000010%
```

```
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

Template

Node Record [NODEREC] 16

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	16	
NODE_ID	03:08	I6		Unique id.
GEOM_ID	09:14	I6		Reference to point geometry.
NUM_LINKS	15:18	I4		Number of links at node.
| (DIR	19:19	I1		1 for start, 2 for end.
| (GEOM_ID	20:25	I6		Reference to link geometry.
| (ORIENT	26:29	R4,1	0000	Not used.
| (LEVEL	30:30	I1	0, 1 or 2	Link level at node.
CONT_MARK	*:*	I1	0	No further records
			or 1	or continuation record follows.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
160000050000070003100000800000200000900000100001200000 0%
      |     1     |     2     |     3     |     4     |     5     |     6     |     7     |     8
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678 90
```

Template

Geometry Record [GEOMETRY1] 21

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	21	
GEOM_ID	03:08	I6		Reference from NODE or LINE.
GTYPE	09:09	A1	1 or 2	1 for node, 2 for link.
NUM_COORD	10:13	I4		Number of coordinate pairs.
| X_COORD	14:17			Easting.
| Y_COORD	18:21			Northing.
| QPLAN	22:22	I1	<S>	Not used.
CONT_MARK	*:*	I1	0	No further records
			or 1	or continuation record.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
210045202000934501982 03672003 04562110 03982134 03882452 03852797 03993012 1%
0004123642 06783548 0%
```

```
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |         |         |         |         |         |         |         |         |
```

Template

Line Record [LINEREC] 23

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	23	
LINE_ID	03:08	I6		Unique id.
GEOM_ID	09:14	I6		Reference to link geometry.
NUM_ATT	15:16	I2	01	Number of ATTRECs.
ATT_ID	17:22	I6		Reference to ATTREC.
CONT_MARK	23:23	I1	0	No further records.
EOR	24:24	A1	%	Record terminator.

Record example:

```
230000270000090100000 60%
      |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

Template

Attribute Description Record [ATTDESC] 40

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	40	
VAL_TYPE	03:04	A2		See table below.
FWIDTH	05:07	A3		See table below.
FINTER	08:12	A5		See table below.
ATT_NAME	13: *	A*		See table below.
DIVIDER	*:*	A1	\	
FDESC	*:*	A*		See table below.
DIVIDER	*:*	A1	\	
CONT_MARK	*:*	I1	0	No further records.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
 40PN   A*   PROPER_NAME\Street Name\0%
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

Template

Valid contents of ATTDESC for OSCAR products

VAL type	FWIDTH	FINTER	ATT type	FDESC
FC	004	I4	FEAT_CODE	Feature code.
FW	001	A1	FORM_OF_WAY	Form of way descriptor.
JN	<3S>	A*	JUNCTION_NAME	Name of road junction.
LL	005	I5	LINE_LENGTH	Length of line feature.
OD	013	A13	OSODR	Unique link identifier.
PN	<3S>	A*	PROPER_NAME	Street name.
RN	<3S>	A*	ROAD_NUM	DfT route number.
SC	001	A1	SOURCE	Source scale of data.
SN	<3S>	A*	SETTLE_NAME	Settlement name.
TR	001	A1	TRUNK_ROAD	Trunk road indicator.

* = variable integer.

Comment Record [COMMENT] 90

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	90	
RECORD_TYPE	03:04	I2		Changed NTF record type.
RECORD_ID	05:17	A13		Unique id (OSODR).
CHANGE_TYPE	18:18	A1	D or I or U	Type of change.
CONT_MARK	19:19	I1	0	No further records.
EOR	20:20	A1	%	Record terminator.

Record example:

```
9023O1J945LPCABAXU0%
```

```
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |         |         |         |         |         |         |         |         |
```

Template

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	90	
FREE_TEXT	03: *	A*		NO OSCAR DATA FOR THIS TILE
CONT_MARK	*:*	I1	0	No further records.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
90NO OSCAR DATA FOR THIS TILE0%
```

```
     |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |         |         |         |         |         |         |         |         |
```

Template

Volume Termination Record [VOLTERM] 99

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	99	
FREE_TEXT	03: *	A*		See note below.
CONT_VOL	*:*	I1	0	No further volumes.
			or 1	Continuation volumes.
EOR	*:*	A1	%	Record terminator.

* = variable integer.

Record example:

```
 99End Of Volume 01 Transfer Set Continues On Volume 02 1%
```

```
     |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |          |          |          |          |          |          |          |
```

Template

Record example:

```
 99End Of Transfer Set0%
```

```
     |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |          |          |          |          |          |          |          |
```

Template

Notes: If there are further volume(s) to follow then the {FREE TEXT} field will comprise the following message:

```
End Of Volume (n) Transfer Set Continues On Volume (n + 1)
```

If there are no further volumes then the {FREE TEXT} field will comprise the message:

```
End Of Transfer Set
```

Appendix A Glossary

accuracy
The closeness of the results of observations, computations or estimates to the true values or the values accepted as being true. Accuracy relates to the exactness of the result, and is a measure of the exactness of the operation by which the result is obtained.

arcs
See link.

ASCII
American Standard Code for Information Interchange – a standard binary coding system used to represent characters within a computer.

attribute
An attribute is a property of an entity, usually used to refer to a non-spatial qualification of a spatially referenced entity. For example, a descriptive code indicating what an entity represents, or how it should be portrayed.

basic scale
The scale at which the survey is undertaken. For Ordnance Survey mapping, three scales are used – 1:1250, 1:2500, 1:10 000. Any area is only maintained at one basic scale.

basic scale map
The largest scale of map published for a particular area of Great Britain. This may be 1:1250 scale for urban areas, 1:2500 scale for rural areas or 1:10 000 scale for mountain and moorland areas.

bit
A unit of information, the word being a blend of binary and digit.

byte
A unit of computer storage of binary data usually comprising 8 bits, equivalent to a character. Hence megabyte (Mb) and gigabyte (Gb).

chain
A directed sequence of non-intersecting line segments, and/or arcs, with nodes at each end. References to left and right area identifiers are optional.

character
A distinctive mark; an inscribed letter; one of a set of writing symbols.

coordinate pair
A coordinate pair is an easting and a northing.

coordinates
Pairs of numbers expressing horizontal distances along orthogonal axes. Alternatively, triplets of numbers measuring horizontal and vertical distances. Row and column numbers of pixels from raw imagery are not considered coordinates for the purpose of the standard.

compact disc-read only memory (CD-ROM)
A data storage medium. A 12 cm disc similar to an audio CD.

contiguous
Literally adjacent, touching. In the context of digital mapping, the word has a special meaning and implies a connected entity.

copyright
The sole legal right to print or publish a work. Crown copyright subsists in all Ordnance Survey publications – including digital map data – for a 50 year period from the end of the year in which they were first published, by virtue of the *Copyright, Designs and Patents Act 1988*.

currency
An expression of the up-to-dateness of data.

data
A representation of facts, concepts or instructions in a formalised manner suitable for communication, interpretation or processing.

database
An organised, integrated collection of data stored so as to be capable of use in relevant applications, with the data being accessed by different logical paths. Theoretically it is application independent, but in reality it is rarely so.

dataset
An Ordnance Survey term for a named collection of logically related features arranged in a prescribed manner. For example, all water features. A dataset has more internal structure than a layer and is related to another dataset only by position.

data format
A specification that defines the order in which data is stored or a description of the way data is held in a file or record.

data model
An abstraction of the real world which incorporates only those properties thought to be relevant to the application or applications at hand. The data model would normally define specific groups of entities and their attributes, and the relationship between these entities. A data model is independent of a computer system and its associated data structures. A map is one example of an analogue data model.

data structure
The defined logical arrangement of data as used by a system for data management; a representation of a data model in computer form.

density
A measure of the number of units of data held on a stated length of storage surface. For example, some magnetic tapes may be recorded at a density of 1600 bits per inch (bpi). Often referred to as packing density.

digital
Data which is expressed as numbers (digits) in computer-readable form is said to be digital.

digitising
The process of converting analogue maps and other sources to a computer-readable form. This may be point digitising – points are only recorded when a button is pressed on a cursor – or stream digitising – points are recorded automatically, at preset intervals of either distance or time.

digital map
Any map sold by Ordnance Survey or its Agents in any form, that is on computer-readable media or as hard copy on paper and/or film or microfilm – produced mainly, or wholly, using computerised means.

edge
An edge is a curve joining two possibly identical nodes without intersecting an edge – including itself. Any sequence of edges either bounds a face and/or represents a line feature. See also link.

edit
The process of validating and correcting errors in digital map data.

feature
An item of detail within a map which can be either a point or symbol, a line or text; a geographical entity such as a building or stream, either taken from a map or surveyed directly from the real world.

feature code (FC)
An alphanumeric code describing or classifying a feature – used in digital map data as an attribute code to describe each feature in terms of the object surveyed, its representation on the map, or both.

feature serial number (FSN)
A number used as a feature identifier usually allocated on a sequential basis. For example, the order in which features are digitised.

format
The specified arrangement of data. For example, the layout of a printed document, the arrangement of the parts of a computer instruction, the arrangement of data in a record.

generalisation
The process of abstracting from the real world through selection, aggregation, simplification and symbolisation for the purpose of representation in spatial data.

geographical information system (GIS)
A system for capturing, storing, checking, integrating, analysing and displaying data that is spatially referenced to the Earth. This is normally considered to involve a spatially referenced computer database and appropriate applications software.

gigabyte (Gb)
1 073 741 824 bytes, a measure of data storage capacity.

grid
The planimetric frame of reference. For example, the National Grid.

information
Intelligence resulting from the assembly, analysis or summary of data into a meaningful form.

intersection
The intersection of a link segment with a construction segment (shot or tape line) or of two construction segments. A construction point is created at the position of the intersection – the internal angle between alignments should be >30°.

junction
A connection between two or more links at a common node. Junctions may be a crossroads or T-junctions.

line
A series of connected coordinated points forming a simple feature with homogeneous attribution.

line feature
The spatial abstraction of an object in one dimension. Lines may intersect with other lines. They are defined as a series of two or more coordinates and may be curved or straight. Curved lines consist of a series of very short straight line segments. Lines may be concurrent with other lines under certain conditions. As an object abstraction a line has no width.

link and node data
A form of vector data in which linear features are represented as links. Links are terminated where they intersect other links. These intersection points, and link ends, may carry nodes whose feature records express the geometric relationships between links.

link, edge or arc
Links are the representation of line features. They are made up of one or more consecutive non-intersecting link segments with common attributes; between two terminating nodes. Links have no connection with other links except at the start or end; via common (shared) terminating nodes (points). All links contain their terminating coordinates. Links may form the boundaries of polygons and may be shared between polygons. See also edge.

map
A holistic representation and intellectual abstraction of geographical reality, intended to be communicated for a purpose or purposes, transforming relevant geographical data into an end-product which is visual, digital or tactile.

megabyte (Mb)
1 048 576 bytes, a measure of data storage capacity.

model
See data model.

National Grid
A unique referencing system which can be applied to all Ordnance Survey maps of Great Britain (GB) at all scales. It is based on 100 km squares covering the whole of GB based on a Transverse Mercator projection. It is used by Ordnance Survey on all post-war mapping to provide an unambiguous spatial reference in GB for any place or entity, whatever the map scale.

National Transfer Format (NTF)
A format designed in 1988 specifically for the transfer of spatial information; it is administered by the British Standards Institution (BSI). It is now the standard transfer format for Ordnance Survey digital map data.

node
An object representation of a point which either does not form any part of a link – isolated node or polygon seed point; or is the representation of a point at the start or end of a link – terminating node. The position of a node is defined by a single coordinate pair – which is repeated within all links logically connected at that node and/or containing it. A node is only deleted if the link containing it as a terminating node is deleted.

node and link structure
See link and node structure data.

object
A collection of entities which form a higher level entity within a specific data model. For example, a group of entities defining a drainage system.

point
A zero-dimensional spatial abstraction of an object represented as a coordinate pair.

point feature
A zero-dimensional spatial abstraction of an object with its position defined by a coordinate pair. Points are represented by nodes which may be isolated or part of a link (terminating). Points may also be represented by symbols which may have attributes such as rotation and size.

positional accuracy
The degree to which the coordinates define a point's true position in the world, directly related to the spheroid and/or projection on which the coordinate system is based.

precision
The exactness with which a value is expressed, whether the value be right or wrong.

record
A set of related data fields grouped for processing.

representation
Depiction or description of an object using symbology.

road centreline
An imaginary line depicting the centre of a road carriageway. (FC98 in OS93 specification.)

rural
All areas of mapping at the basic scale of 1:2500 which are not classified as urban.

section
In NTF terminology, a subdivision of a database. In Ordnance Survey terms this equates to a single map sheet, that is, a digital map file or a tile.

segment
A chord defined by two consecutive coordinates in a line string.

source scale
The scale of the source information from which the map was digitised, that is, the scale of survey for a basic scale map, or the scale of the source map for a derived map.

spatial data
Data which includes a reference to a two- or three-dimensional position in space as one of its attributes. It is used as a synonym for geometric data.

structure
See data structure.

tile
Broadly synonymous with digital map file, it implies evenly-sized map sheet units.

topography
The study of the physical features of the Earth. A topographic map's principal purpose is to portray and identify the features of the Earth.

topology
The study of the properties of a geometric figure which are not dependent on position, such as connectivity, relationships between lines, nodes and polygons.

transfer set
A specific NTF term for the data, together with its supporting information, which the customer receives.

UNIX®
An operating system that supports multi-tasking and is used by many workstations and mini-computers.

Appendix B OSCAR Address-Ranges information

The product, Address-Ranges, is no longer available for new customer supply.

Address-Ranges – an introduction

Address-Ranges is a database of house numbers and names attached to the portions of a link to which they apply.

Address-Ranges is an exclusive option for OSCAR Traffic-Manager and updates will be released on an identical schedule.

Address-Ranges version number

The version numbering of Address-Ranges will be identical to the OSCAR Traffic-Manager data it is supplied with and can be found in the Database Header Record [DBHREC].

Address-Ranges features

Address-Ranges feature the range of address numbers and house names applied sequentially along each side of a link between junctions with:

- left or right side of link identifier;
- direction in which the addresses run;
- highest and lowest building number for each side of the link;
- house names; and
- postcode.

Address-Ranges data source

Address-Ranges is derived from the latest version of ADDRESS-POINT®, an Ordnance Survey data product.

ADDRESS-POINT is created from the Royal Mail Postal Address File (PAF®), Land-Line and OSCAR. Other data is collected from trade directories, building notifications and field visits.

Change information

Change information on Address-Ranges attribution is not available in the supplied data at the moment.

Details of Address-Ranges

An Address-Range can be a range of address numbers, for example 2–10 building text (if there are no numbers); a single number, for example, 2; or a combination depending upon the address layout of a road.

The data will also show whether house number ranges are odd, even or sequential.

House names will be listed in the order they fall along their respective sides of the road.

Postcodes are shown for the range of addresses and not for each individual address or in any particular order.

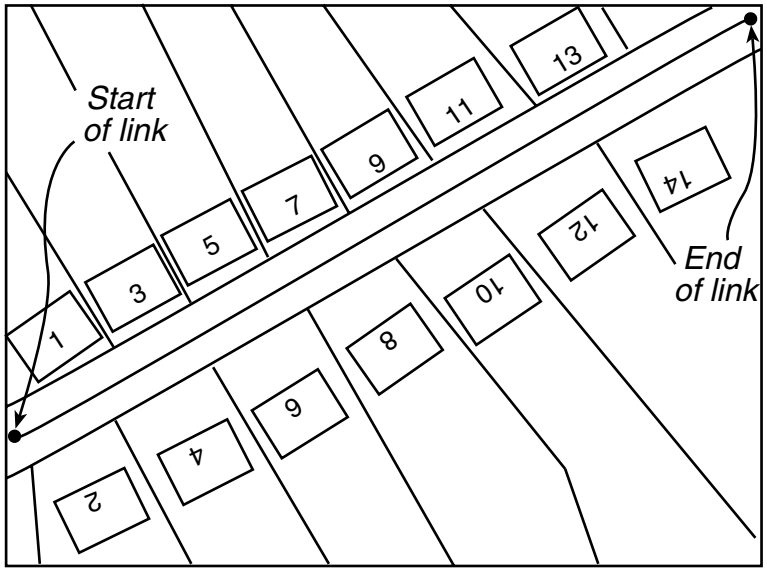
Named paths and walkways are currently not available in Address-Ranges.

Blocks of flats will be shown as a single text or numbered address.

Full details on Address-Ranges NTF record layouts and attribution can be found at Address-Ranges in NTF in this chapter.

Address-Ranges information can be found in the Attribute Record [ATTREC]. The direction of the address range will be shown as following the direction of the coordinates of the link as found in the Geometry Record [GEOMETRY1].

Figure B.1: example Attribute Record for a link

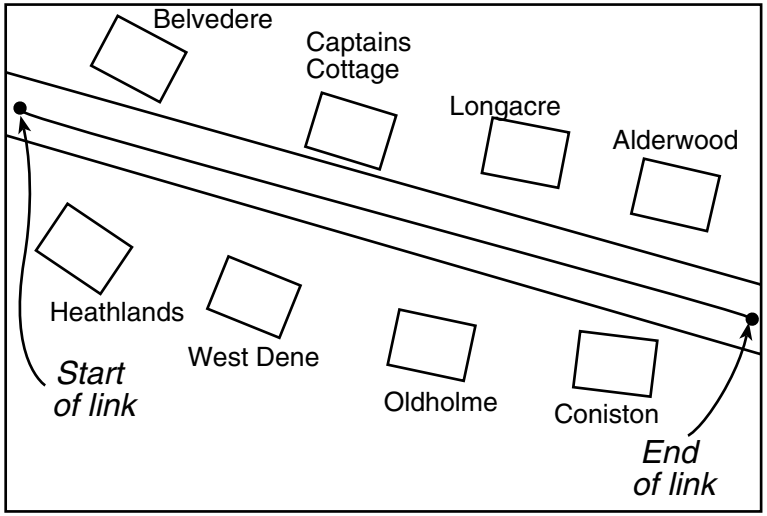


In this example the Attribute Record [ATTREC] for the link will identify:

\PUSO44 3PR\PUSO44 3PS\LR1-13(O),1\RG2-14(E),1

This states that the Address-Range features two postcodes (PU) which are listed in full. On the left side of the road (LR) are numbers 1–13 and this sequence (O) is odd numbers. On the right side of the road (RG) the Address-Range is 2–14 and all numbers (E) are even. The number 1 after (O) and (E) denotes that this is the first range for that side of the link.

Figure B.2: example Attribute Record for a link



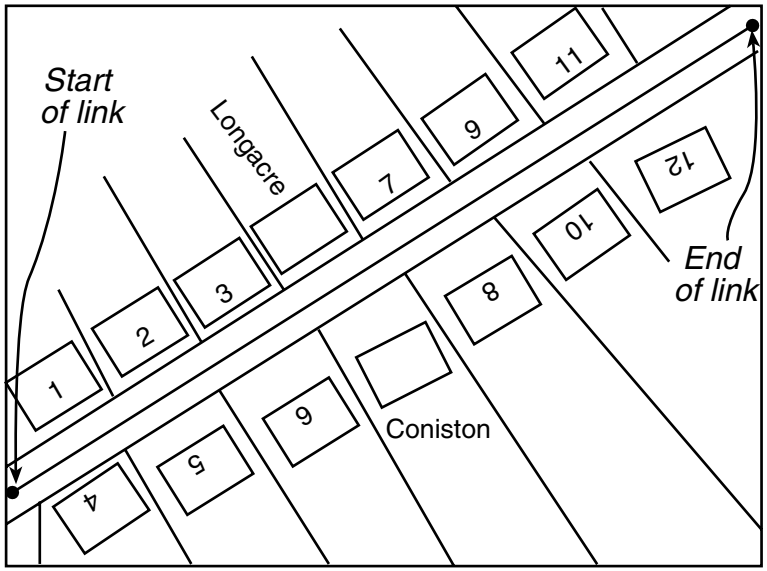
In this example the Attribute Record [ATTREC] for the link will identify:

\PUSO44 3PR\PUSO44 3PS\LXBelvedere,1\LXCaptains Cottage,2\LXLongacre,3\LXAlderwood,4\RYHeathlands,

1\RYWest Dene,2\RYOldholme,3\RYConiston,4\

This shows the postcodes (PU), the range of house names on the left (LX) and right (RY) side of the road and the sequence in which they run.

Figure B.3: example Attribute Record for a link



In this example the Attribute Record [ATTREC] for the link will identify:

\PUSO44 3PR\PUSO44 3PS\LR1-3(S),1\LXLongacre,2\LR7-11(O),3\RG4-6(S),1\RYConiston,2\ RG8-12(E),3

This shows the postcodes (PU) followed by the first range on the left side (LR) which is numbers 1–3 in sequence (S), followed by a single named house (LX), with odd numbered houses (O) between 7–11 finishing the range (LR). The right side has numbers (RG) 4–6 in sequence (S), followed by a single named house (RY) and ending with even numbered (E) houses (RG) between 8–12.

Currency

Address-Ranges are derived from the most current ADDRESS-POINT dataset available at the time of the OSCAR Traffic-Manager freeze.

Address-Ranges in NTF

We recommended that you read chapter 6 and chapter 7 of this user guide first, to obtain a full understanding of OSCAR in NTF.

When OSCAR Traffic-Manager is supplied with Address-Ranges, the format of the NTF records will be changed as shown on the following page.

Database Header Record [DBHREC] 02

The Database Header Record will take the following format when Address-Ranges is supplied with OSCAR Traffic-Manager.

Note: If Address-Ranges is not being supplied, then the Database Header Record will remain unchanged.

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	02	
DBNAME	03:22	A20	OSCAR_TRAFFIC_01.99<1S>	Database name.
DDNAME	23:42	A20	DEFAULT_02.00<7S>	
DDATE	43:50	DATE	19920515	Release date of NTF version being used.
DDBASE	51:70	A20	<20S>	Not used.
DDBDATE	71:78	DATE	00000000	Not used.
CONT_MARK	79:79	I1	1	Continuation record.
EOR	80:80	A1	%	Record terminator.

Continuation of Database Header Record

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	00	
FCNAME	03:22	A20	OSCAR_TMAR_01.00<4S>	Data specification.
FCDATE	23:30	DATE	19990401	Date of data specification.
DQNAME	31:50	A20	<20S>	Not used.
DQDATE	51:58	DATE	00000000	Not used.
DATA_MODEL	59:60	I2	00	Not used.
CONT_MARK	61:61	I1	0	No further records.
EOR	62:62	A1	%	Record terminator.

Record example:

```
 02OSCAR_TRAFFIC_01.97 DEFAULT_02.00       19920515                    000000001%
 00OSCAR_TMAR_01.00    19970401                    00000000000%
 230042510000090200000600425l0%
```

```
     |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |    |     |    |     |    |     |    |     |    |     |    |     |    |     |    |
```

Template

Attribute Description Record [ATTDESC] 40

The Attribute Description Record will take the following format. The record examples shown are the additional Attribute Description Records that will be required to support Address-Ranges, over and above the standard OSCAR Traffic-Manager Attribute Description Records.

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	40	
VAL_TYPE	03:04	A2		See table below.
FWIDTH	05:07	A3		See table below.
FINTER	08:12	A5		See table below.
ATT_NAME	13:*	A*		See table below.
DIVIDER	*:*	A1	\	
FDESC	*:*	A*		See table below.
DIVIDER	*:*	A1	\	
CONT_MARK	*:*	I1	0	No further records.
EOR	*:*	A1	%	Record terminator.

Record example:

```
40PU   A*   POST_CODE_UNIT\Post Code Unit\0%
40LA   A*   LEFT_SING_ADDR\Left Single Address\0%
40LR   A*   LEFT_ADDR_RANGE\Left Address Range\0%
40LX   A*   LEFT_BUILD_TEXT_NAME\Left Building Text Name\0%
40RF   A*   RIGHT_SING_ADDR\Right Single Address\0%
40RG   A*   RIGHT_ADDR_RANGE\Right Address Range\0%
40RY   A*   RIGHT_BUILD_TEXT_NAME\Right Building Text Name\0%
```

```
     |    1     |    2     |    3     |    4     |    5     |    6     |    7     |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     |    |     |    |     |    |     |    |     |    |     |    |     |    |     |
```

Template

Attribute Record [ATTREC] 14

These records will be defined as an attribute of a line. A separate Attribute Record will be used for each link. The Attribute Record will take the following format.

Field	Position	Format	Value example	Description
REC_DESC	01:02	A2	14	
ATT_ID	03:08	I6		Unique id for record.
VAL_TYPE	09:10	A2	OD	
VALUE	11:23	A13		Unique id (OSODR) of link.
VAL_TYPE	24:25	A2	FC	
VALUE	26:29	I4		Feature code.
VAL_TYPE	*.*	A2	SC	
VALUE	*.*	A1		Source scale.
VAL_TYPE	*.*	A2	LL	
VALUE	*.*	I5		Length of link.
VAL_TYPE	*.*	A2	PN	
VALUE	*.*	A*		Road name.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	RN	
VALUE	*.*	A*		Road number.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	TR	
VALUE	*.*	A1		Trunk road indicator.
VAL_TYPE	*.*	A2	FW	
VALUE	*.*	A1		Form of way.
VAL_TYPE	*.*	A2	PU	
VALUE	*.*	A*		Postcode unit.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	LR	
VALUE	*.*	A*		Left address range.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	LX	

Field	Position	Format	Value example	Description
VALUE	*.*	A*		Left building text name.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	LA	
VALUE	*.*	A*		Left single address.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	RG	
VALUE	*.*	A*		Right address range.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	RY	
VALUE	*.*	A*		Right building text name.
DIVIDER	*.*	A1	\	
VAL_TYPE	*.*	A2	RF	
VALUE	*.*	A*		Right single address.
DIVIDER	*.*	A1	\	
CONT_MARK	32:32	I1	0	No further records.
EOR	33:33	A1	%	Record terminator.

Record example:

```
14000018ODO2ARX1Y42NBFVFC3004SCALL00369PNCALVERT ROAD\LR21-121(O),1\LR00125-121%
003(O),2\LA127,3\RG2-44(E),1\RY46A,2\RY46B,3\RG48-52(E),4\RG58-94(E),5\0%
```

```
      |    1    |    2    |    3    |    4    |    5    |    6    |    7    |    8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      |         |         |         |         |         |         |         |         |
```

Template

Data classification and metadata

NTF attributes

The following NTF codes are used in the supply of Address-Ranges.

Attribute code	Attribute	Attribute name	Description
PU	Postcode unit	POST_CODE_UNIT	The combination of postcode area, district, sector and unit codes applicable for all or part of a link.
LR	Left address range	LEFT_ADDR_RANGE	Range of building numbers that occur on the left-hand side of a link.
LX	Left building text name	LEFT_BUILD_TEXT_NAME	The text details of an individual address that appears on the left-hand side of a link.
LA	Left single address	LEFT_SING_ADDR	A single address which appears on the left-hand side of a link.
RG	Right address range	RIGHT_ADDR_RANGE	Range of building numbers that occur on the right-hand side of a link.
RY	Right building text name	RIGHT_BUILD_TEXT_NAME	The text details of an individual address that appears on the right-hand side of a link.
RF	Right single address	RIGHT_SING_ADDR	A single address which appears on the right-hand side of a link.

Address-Ranges qualifiers

The values listed below will be used to define the contents of a numeric address range.

E All numbers in the range are even, for example, 2, 4, 6.

O All numbers in the range are odd, for example, 1, 3, 5.

S Numbers in the range are sequential, for example, 7, 8, 9.

Appendix C Product and service performance report form

Ordnance Survey welcomes feedback from its customers about OSCAR Asset-Manager and OSCAR Traffic-Manager.

If you would like to share your thoughts with us, please print a copy of the form and when completed post or fax it to the address below.

Your name: ..... Phone: .....

Organisation: ..... Fax: .....

Address: ..... Email: .....

.....

.....

Postcode: .....

Please record your comments or feedback in the space below. We will acknowledge receipt of your form within 3 working days and provide you with a full reply or a status report within 21 working days.

If you are posting this form, please send it to:

Customer Contact Centre, Ordnance Survey, Romsey Road, SOUTHAMPTON, SO16 4GU.

Fax: 023 8079 2615